Proposed Plan

Durham Meadows Superfund Site Durham, CT

The Cleanup Proposal At A Glance

After careful consideration of the impacts of contamination at the Durham Meadows Superfund site, the United States Environmental Protection Agency (EPA) proposes the following cleanup plan:

- Excavation and off-site disposal of soil at and adjacent to the Merriam Manufacturing Company property in conjunction with soil vapor extraction at Merriam to address contamination in soil and vapor.
- Excavation and off-site disposal of soil at the Durham Manufacturing Company property to address contamination in shallow groundwater and its source.
- Connection to the Middletown Water Distribution System to provide an alternative source of public water to all residences currently affected by groundwater contamination and additional residences located near the contaminated area.
- Monitor the overall area of groundwater contamination to ensure no migration of groundwater beyond its current general boundary, along with a contingency to implement a groundwater extraction system for hydraulic containment if the contamination spreads.
- Implementation of a waiver of federal and state requirements that would normally require cleanup of the groundwater to meet drinking water standards, since it is not technically practicable to clean up the groundwater to drinking water standards in a reasonable amount of time.
- Institutional controls, such as by-laws, deed restrictions, or some other mechanism, that would prevent unrestricted future use of certain areas of the site or use of contaminated groundwater.
- Further characterization of areas posing potential indoor air risks. If there are unacceptable risks, further actions will be taken to address such risks.

A closer look at the proposed plan can be found on pages 8-10.

Your Opinion Counts!

EPA is accepting public comment on this cleanup proposal and all other alternatives from **July 13, 2005 through August 12, 2005.** If you have comments regarding EPA's proposed cleanup plan, we want to hear from you before making a final decision. EPA's preferred cleanup alternative can change based upon your input.

A public meeting and hearing will be held on July 28 to provide an opportunity for citizens and local officials to offer oral or written comments.

Thursday, July 28, 2005 at 7:00 p.m.
Durham Public Library
7 Maple Avenue Durham, CT

If you are unable to attend the public hearing, you may also submit written comments - see page 29. to find out how. For more information about the proposed plan, public hearing, or should you have specific needs or questions about the public meeting facility and its accessibility, please contact EPA Community Involvement Coordinator Jim Murphy (toll free): 888-372-7341 x 81028.

This document summarizes EPA's cleanup proposal. For detailed information on the options evaluated for use at the site, see the Feasibility Study available for review on CD at the information repositories at the Durham Public Library and at EPA's 1 Congress Street Office in Boston. An index for the Administrative Record is available on EPA's website at:

www.epa.gov/ne/superfund/sites/durham

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In accordance with the Comprehensive Environmental Response, Compensation, and Liability Act, (Section 117) the law that established the Superfund program and the National Contingency Plan Section 300.430(f)(2), this document summarizes EPA's cleanup proposal. For detailed information on the options evaluated for use at the site, see the Feasibility Study available for review on CD at the information repositories at the Durham Public Library and at EPA's 1 Congress Street Office in Boston. An index for the Administrative Record is available on EPA's website at: www.epa.gov/ne/superfund/sites/durham

The public can obtain more information from the Administrative Record, available for review on CD at the information repositories. The Administrative Record includes all documents considered during selection of the proposed cleanup plan, including the following key reports:

- Draft Final Remedial Investigation Report, Volumes I and II, dated June 2005
- Draft Final Feasibility Study Report, dated June 2005
- Draft Final Technical Impracticability Evaluation Report, dated June 2005
- Draft Final Baseline Human Health Risk Assessment Report, dated June 2005.

Information Repositories

Durham Public Library
7 Maple Avenue
Durham, CT 06422-2112
860-349-9544

Library hours are 10:00 a.m. - 9:00 p.m. Monday - Thursday, and 10:00 a.m. - 5:00 p.m. Friday and Saturday.

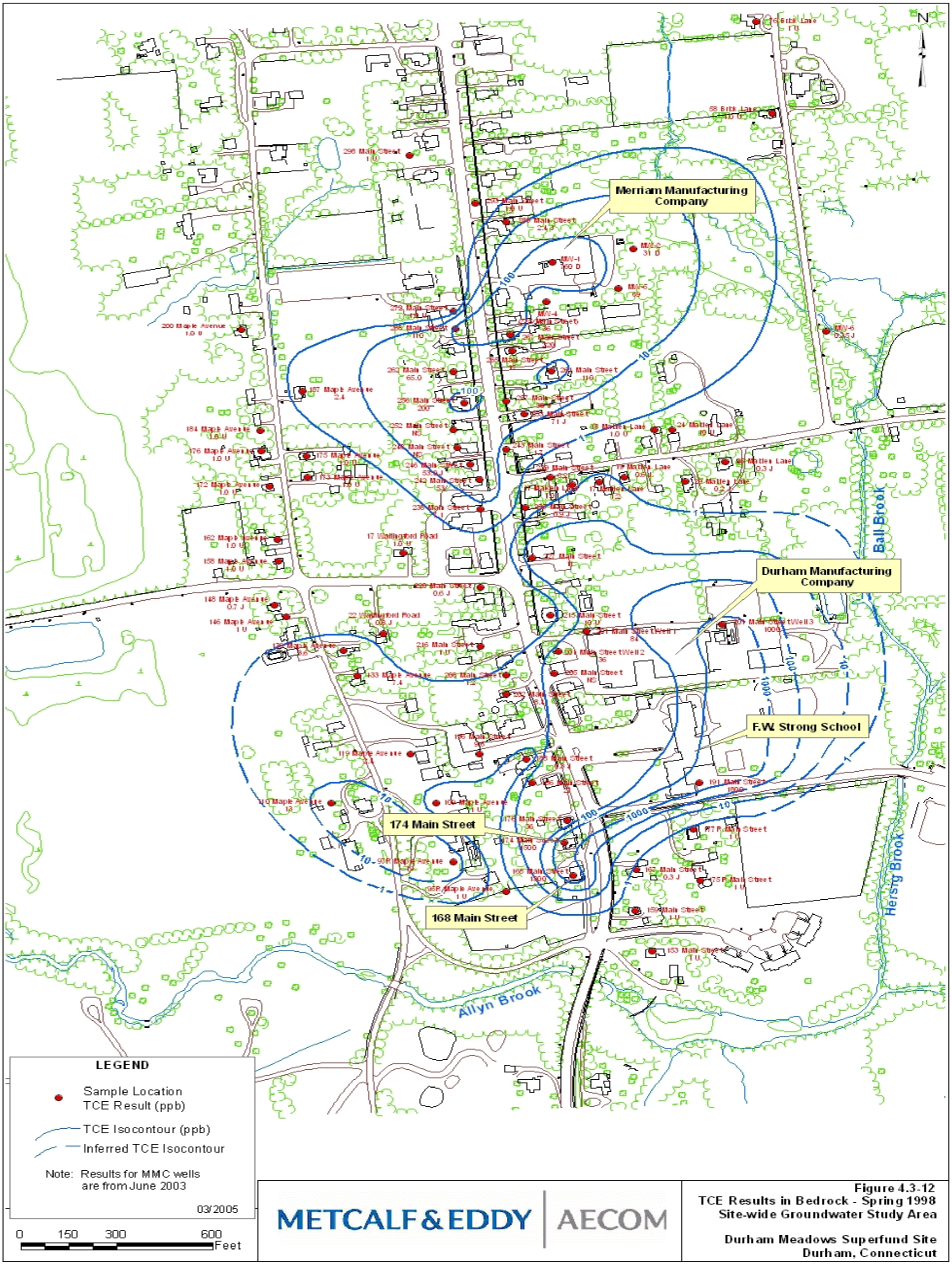
EPA Records Center
One Congress Street, Suite 1100
Boston, MA 02114-2023
Please call to schedule an appointment
617-918-1440

If you have any questions about the site or would like more information, you may call or write to:

Anni Loughlin
U.S. EPA (HBT)
One Congress St., Suite 1100
Boston MA 02114-2023
Telephone: 617-918-1273
Fax: 617-918-0273
E-mail: loughlin.anni@epa.gov

Jim Murphy, Community Involvement Coordinator
U.S. EPA (HIO)
One Congress Street, Suite 1100
Boston, MA 02114-2023
Telephone: 617-918-1028
Fax: 617-918-0028
E-mail: murphy.jim@epa.gov

Figure 1


Merriam Manufacturing Company
Durham Manufacturing Company
F.W. Strong School
174 Main Street
168 Main Street
Ball Brook
Hersig Brook
Allyn Brook
LEGEND
Sample Location TCE Result (ppb)
TCE Isocontour (ppb)
Inferred TCE Isocontour
Note: Results for MMC wells are from June 2003
03/2005
0 150 300 600 Feet
METCALF & EDDY | AECOM
Figure 4.3-12
TCE Results in Bedrock - Spring 1998
Site-wide Groundwater Study Area
Durham Meadows Superfund Site
Durham, Connecticut

Overview and History

The Durham Meadows Superfund Site is located in the Town of Durham, Connecticut, and includes an area of groundwater contamination generally centered on Main Street (see Figure 1 on page 3). The Site borders Ball and Hersig Brooks to the east and Allyn Brook to the south and is approximately ½ mile from the Coginchaug River to the west. Geology in the overall area is characterized by low-permeability fractured glacial till overburden overlying fractured bedrock.

Investigations at the Durham Meadows Superfund Site generally center on the Durham Manufacturing Company (DMC) (See Figure 3 on page 7) and the former location of Merriam Manufacturing Company (MMC) (see Figure 2 on page 6), both located on Main Street, as well as the overall area of groundwater contamination surrounding both facilities. Both companies manufacture metal cabinets, boxes and other items. The companies' past disposal of wastewater in lagoons or sludge drying beds (formerly accepted waste management practices), and inadequate drum storage practices at MMC, contributed to the contamination at each facility and in the overall area of groundwater surrounding both facilities.

In 1982, the Connecticut Department of Environmental Protection (CT DEP) detected volatile organic compounds (VOCs - commonly found in solvents, paints and degreasers) in private drinking water wells in the Durham area. Subsequently, field investigations and/or limited soil cleanup activities were undertaken at both facility properties, however, the VOCs had already penetrated the bedrock aquifer, the source of domestic well water. Under a CT DEP order, MMC and DMC installed carbon filters on impacted residential wells.

Currently, all impacted wells are fitted with two carbon filters. The two companies have monitored and maintained up to 38 filtered wells on a quarterly basis. DMC is responsible for servicing 14 of these wells. MMC is responsible for servicing 24 of these wells, but ceased these activities in late 2004; CT DEP has taken over monitoring and maintenance of these locations. Regional School District #13 was maintaining and monitoring filters at the Strong School at 191 Main Street in Durham until August 2004, when it connected to a well system at the Coginchaug Regional High and Korn Elementary Schools (to the east, and upgradient of the site). EPA discovered 1,4-dioxane in 2003-2004 in wells at MMC, DMC, and at a number of residences. Because this compound is not effectively captured by the current carbon filters, CT DEP is supplying bottled water for drinking to several affected homes in the northern portion of the site, and requires monitoring for this compound at a number of residences throughout the site.

The contaminants of potential concern at the site are primarily VOCs, including trichloroethylene (TCE), 1,1,1-trichloroethane (1,1,1-TCA), tetrachloroethene (PCE), 1,1-dichloroethane, and methylene chloride. Additional contaminants include 1,4-dioxane (a stabilizer used with 1,1,1-TCA), polycyclic aromatic hydrocarbons (PAHs), and heavy metals such as lead, chromium and arsenic.

EPA conducted a Screening-Level Ecological Risk Assessment for the site, sampling along Ball Brook, wetland and wet meadow areas behind the companies, and upstream locations. The assessment concluded there is no actionable ecological risk associated with the site.

EPA also conducted a Human Health Risk Assessment for the site, separately assessing the three Study areas. Further details are available in the Draft Final Baseline Human Health Risk Assessment Report, dated June 2005.

Summary of Site History

1851:	Merriam Manufacturing Company (MMC) established.
1922:	Durham Manufacturing Company (DMC) established.
1970:	Groundwater contamination first detected at the F.W. Strong School, located adjacent to the DMC property. Samples contained volatile organic compounds (VOCs) such as tetrachloroethene (PCE) and chloroform.
1982:	CT DEP detects VOCs in drinking water samples collected from residential wells in the Durham area, including trichloroethylene (TCE) and 1,1,1-trichloroethane (1,1,1-TCA). CT DEP issues pollution abatement orders to MMC and DMC; both companies begin monitoring drinking water in nearby homes and treating homes impacted by VOCs using granular activated carbon filters. Both companies also conduct several environmental investigations on their own facilities over the next several years.
1989:	EPA placed the Durham Meadows site on EPA's Superfund List.
93-95:	EPA's contractor Metcalf & Eddy (M&E) and the United States Geological Survey (USGS) conduct preliminary investigations at the site.
1997:	EPA and DMC enter into an agreement for the performance of a site-wide Remedial Investigation and Feasibility Study (RI/FS). MMC and its president, Allan Adams, did not participate in the RI/FS.
1998:	The bulk of MMC's facility is destroyed in a fire.
1999:	EPA's contractor, Lockheed Martin, conducts field activities to investigate ecological risk at the site.
2000:	DMC conducts field investigations on its own property.
2001:	EPA and DMC conduct two rounds of sampling of untreated water in approximately 80 residential wells to further determine the nature and extent of contamination.
2003:	EPA conducts field investigations at the MMC property.
03-04:	EPA conducts additional residential well sampling at approximately 80 locations to investigate the presence of the contaminant 1,4-dioxane. (Note that 1,4-dioxane is not the same as dioxin, a different type of contaminant.)
2004:	CT DEP requires 1,4-dioxane be added to monitoring for certain homes. Several homes are provided with bottled water for drinking due to 1,4-dioxane movement through existing GAC drinking water filters.
2004:	MMC ceases monitoring and filtration of affected homes near its property. CT DEP takes over this work.
2005:	EPA conducts soil vapor and indoor air sampling at a limited number of homes.
2005:	EPA finalizes the Remedial Investigation and Feasibility Study and prepares this proposed plan for public comment.

For the purposes of the Remedial Investigation and Feasibility Study, the site was separated into three study areas:

- The Merriam Manufacturing Company (MMC) Study Area,
- The Durham Manufacturing Company (DMC) Study Area, and
- The Site-wide Groundwater Study Area.

Why is Cleanup Needed?

For the MMC Study Area, contaminant levels in surface soil and soil vapor pose an unacceptable risk to the current adjacent resident through dermal contact and inhalation respectively, as well as to future residents of the MMC property. The contaminated portions of the MMC Study Area are currently fenced.

For the DMC Study Area, contaminant levels in overburden (shallow) groundwater present an unacceptable risk to a future construction worker that comes into contact with the shallow groundwater. Contaminants in shallow groundwater also pose an inhalation risk to any future resident that comes to be located on the DMC property. There is no current risk to workers at DMC posed by direct contact to soils; there is a risk to DMC workers through contact of shallow groundwater in a construction scenario.

For the overall Site-Wide Groundwater Study Area, contaminated groundwater poses a current ingestion risk for approximately 35 private wells, as well as a future ingestion risk for residents exposed to similar contaminants. Risk was calculated based on data colleted in 1998 and 2004, and makes a worst-case assumption that residents are drinking untreated, unfiltered water. Groundwater also poses an ingestion risk to current and future commercial workers at the DMC facility through use of an onsite well.

Actual or threatened releases of hazardous substances from this site, if not addressed by the proposed cleanup plan or other measures considered, may present current or future threats to public health, welfare, or the environment. It is EPA's current judgment that the preferred alternative, or other active measures considered in the proposed plan, are necessary to protect public health or welfare or the environment from an actual or threatened release of hazardous substances into the environment.

Based on the human health risks described above, EPA evaluated cleanup alternatives for each study area in the Feasibility Study. Further details are available in the Draft Final Feasibility Study Report and the Draft Final Technical Impracticability Evaluation Report, both dated June 2005. Section 2.0 of the Feasibility Study specifically presents Remedial Action Objectives and Preliminary Remediation Goals (e.g., cleanup levels) selected for each study area.

The Feasibility Study, as well as the Technical Impracticability Evaluation Report, also evaluated the feasibility of cleaning up groundwater in a reasonable period of time. The overburden (soil above bedrock) at both companies is low permeability, fractured glacial till formation. The bedrock in the area is highly fractured. Based on the long history of chlorinated solvent use and disposal practices at both companies, the persistence of contamination still associated with source areas and at many residential locations, and the high overburden contaminant groundwater detections at the DMC property, it is likely that dissolved non-aqueous phase liquid ("DNAPL") exists in the till at MMC and DMC as well as in fractured bedrock.

DNAPL is a liquid that is denser than water and does not dissolve or mix easily in water. Many chlorinated solvents, such as trichloroethylene (TCE), are DNAPLs. In the presence of water, DNAPL forms a separate phase from the water, which can be very mobile in the subsurface. DNAPL can sink below the water table, spreading laterally as it encounters finer grained layers. DNAPL can also migrate along the top of downward sloping geologic layers or along fractures, and penetrate into deeper aquifers. DNAPL may pool in dead-end fractures or remain as residual in till fractures where it continues to dissipate over time, providing a continuous source of contamination. Limitations on the hydraulic accessibility of DNAPL, coupled with the low permeability of the till, make removal of DNAPL and restoration of groundwater to background levels within a reasonable time frame (e.g., less than 100 years) very unlikely. There are currently no available technologies that are known to be effective in restoring DNAPL zones in complex heterogeneous geologic environments to drinking water quality in a reasonable time frame. Accordingly, EPA is waiving the applicable and relevant and appropriate requirements (ARARs) for groundwater cleanup as discussed below.

CT DEP has classified the aquifer for drinking water purposes; however, the overburden and bedrock aquifers in the study area are not expected to yield sustainable, significant quantities of water for use as a public drinking water resource.

FIGURE 2

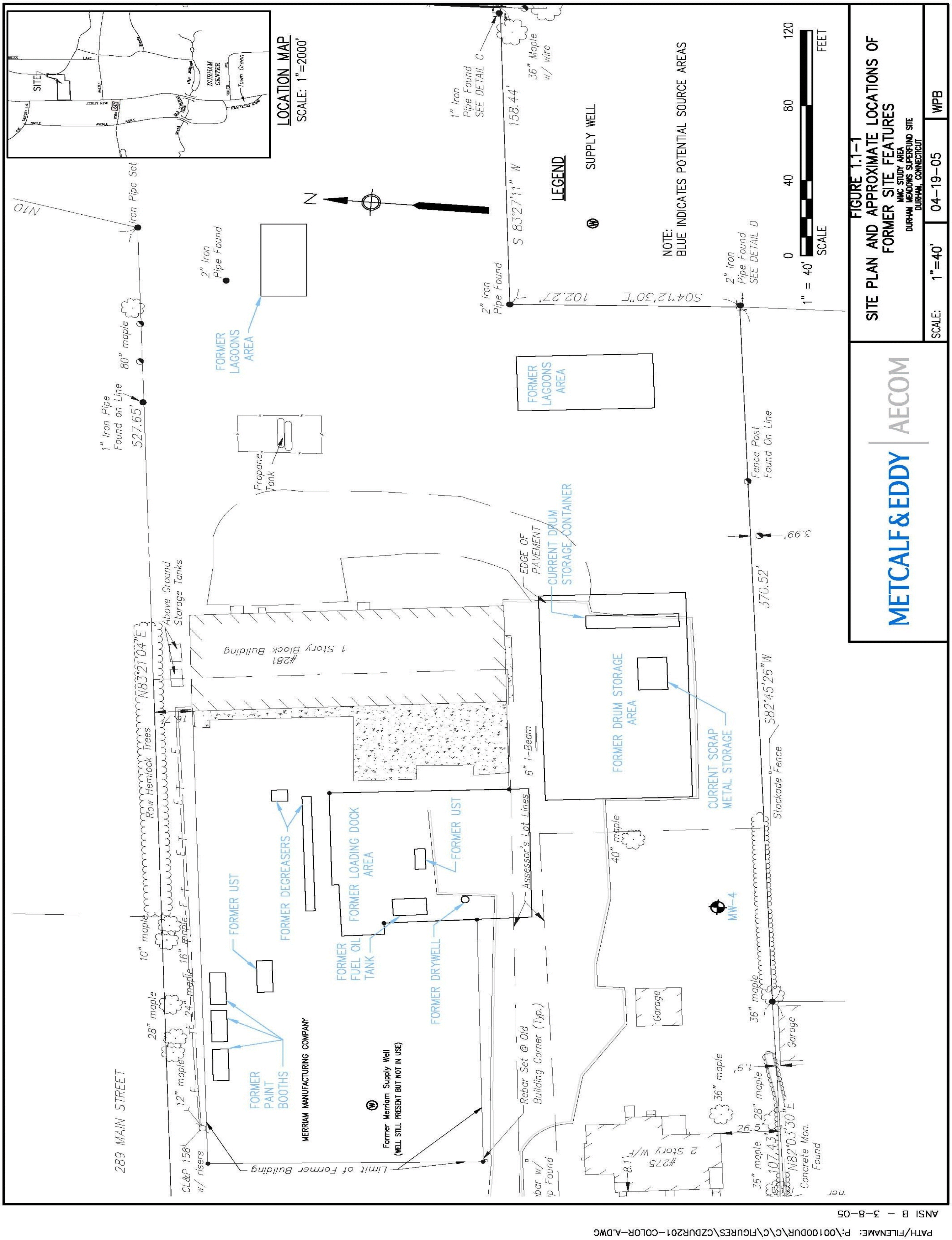
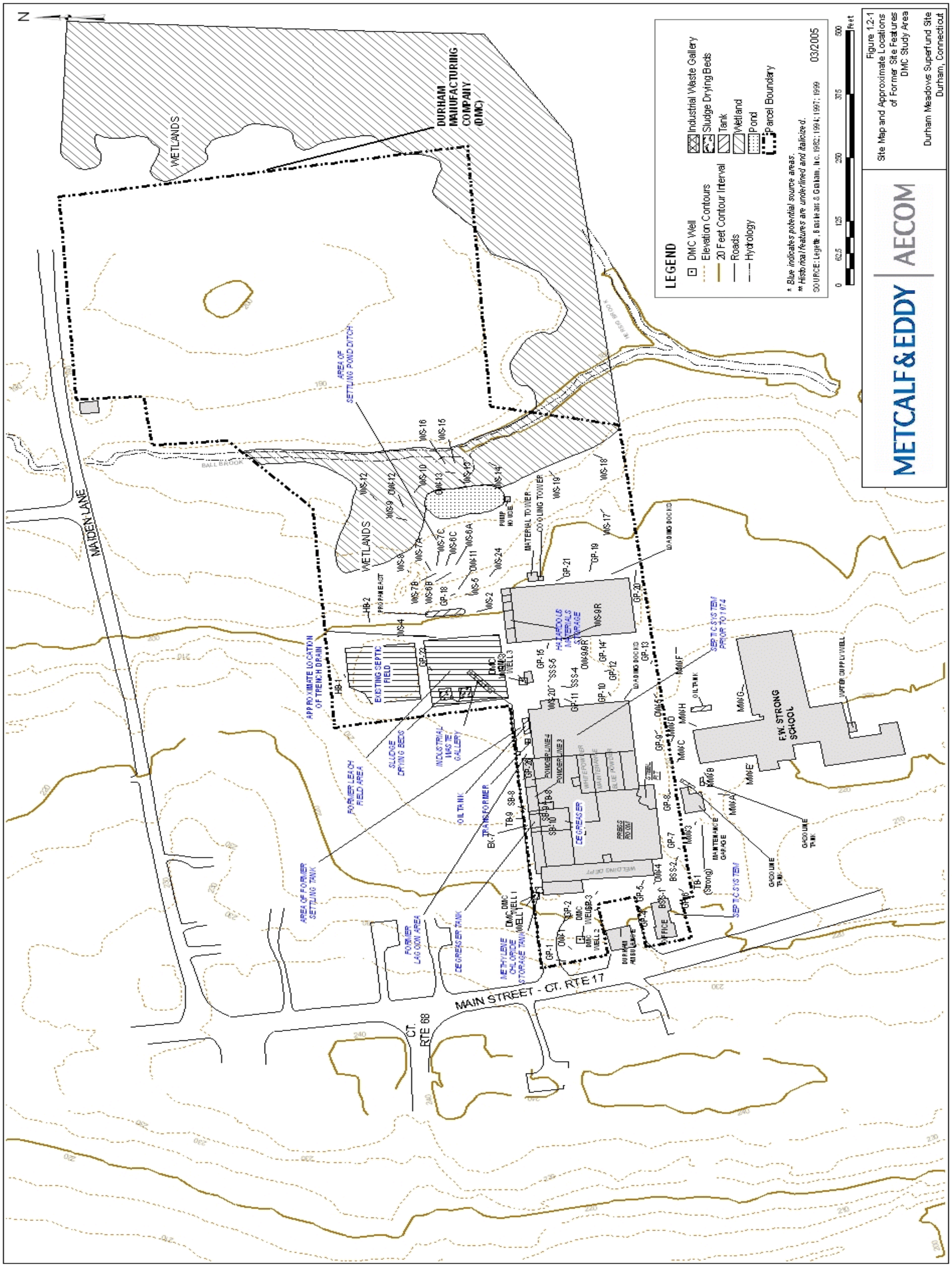


FIGURE 1.1-1
SITE PLAN AND APPROXIMATE LOCATIONS OF FORMER SITE FEATURES
MMC STUDY AREA
DURHAM MEADOWS SUPERFUND SITE
DURHAM, CONNECTICUT
SCALE: 1"=40'
04-19-05
WPB
METCALF & EDDY | AECOM
LOCATION MAP
SCALE: 1"=2000'
LEGEND
SUPPLY WELL
NOTE:
BLUE INDICATES POTENTIAL SOURCE AREAS
1" = 40'
SCALE
FEET
0
40
80
120
FORMER LAGOONS AREA
FORMER LAGOONS AREA
Propane Tank
CURRENT DRUM STORAGE CONTAINER
EDGE OF PAVEMENT
1 Story Block Building
#281
FORMER DRUM STORAGE AREA
CURRENT SCRAP METAL STORAGE
FORMER LOADING DOCK AREA
FORMER UST
FORMER DEGREASERS
FORMER UST
FORMER FUEL OIL TANK
FORMER DRYWELL
FORMER PAINT BOOTHS
MERRIAM MANUFACTURING COMPANY
Former Merriam Supply Well
(WELL STILL PRESENT BUT NOT IN USE)
Limit of Former Building
Assessor's Lot Lines
Rebar Set @ Old Building Corner (Typ.)
MW-4
Garage
Garage
2 Story W/F
#275
289 MAIN STREET
Row Hemlock Trees
Above Ground Storage Tanks
Stockade Fence
Fence Post Found On Line
N83°21'04"E
S82°45'26"W
S 83°27'11" W
S04°12'30"E
158.44'
102.27'
370.52'
527.65'
107.43'
N82°03'30"E
Concrete Mon. Found
1" Iron Pipe Found on Line
Iron Pipe Set
2" Iron Pipe Found
1" Iron Pipe Found SEE DETAIL C
2" Iron Pipe Found SEE DETAIL D
36" Maple w/ wire
6" I-Beam
CL&P 156 w/ risers
ANSI B – 3-8-05
PATH/FILENAME: P:\00100DUR\C\C\FIGURES\CZDUR201-COLOR-A.DWG

FIGURE 3



LEGEND
DMC Well
Elevation Contours
20 Feet Contour Interval
Roads
Hydrology
Industrial Waste Gallery
Sludge Drying Beds
Tank
Wetland
Pond
Parcel Boundary
* Blue indicates potential source areas.
** Historical features are underlined and italicized.
SOURCE: Legette, Brashears & Graham, Inc. 1982; 1994; 1997; 1999
03/2005
0 62.5 125 250 375 500 Feet
Figure 1.2-1
Site Map and Approximate Locations of Former Site Features
DMC Study Area
Durham Meadows Superfund Site
Durham, Connecticut
METCALF & EDDY | AECOM
DURHAM MANUFACTURING COMPANY (DMC)
WETLANDS
MAIDEN LANE
MAIN STREET - CT. RTE 17
CT. RTE 68
F.W. STRONG SCHOOL
BALL BROOK

A Closer Look at EPA's Proposal

EPA is proposing a cleanup plan that is specific to each of the Study Areas. This cleanup plan and the other alternatives are described in further detail in the Draft Final Feasibility Study Report dated June 2005.

MMC Study Area. EPA proposes to address soil and soil vapor contamination on the property using a combination of two alternatives: Alternative MMC S-3 Excavation and Off-site Disposal, and Alternative MMC SV-3 Soil Vapor Extraction. This alternative requires that VOCs in soil vapor be treated via soil vapor extraction (SVE) first. In this technology, a vacuum is applied through wells near the source of contamination in the soil. VOCs "evaporate" and the vapors are drawn toward the extraction wells. Extracted vapor is then treated as necessary (commonly with carbon adsorption) before being released to the atmosphere. Remaining soil that exceeds cleanup levels will be excavated and shipped off-site to an approved disposal facility. Institutional controls will be required to ensure that any new structures on the property be constructed to minimize potential inhalation risks. While SVE will treat soil vapor prior to excavation on the bulk of the MMC property, excavation of a localized area of PAH contamination in surface soils would occur more immediately, to address potential dermal contact risks to the adjacent resident.

Excavation alone could provide a similar level of protection of human health and the environment, but the use of SVE prior to excavation is expected to minimize the volume and depth of excavation needed to address all contaminants on site. This may reduce the estimated cost of the remedy for this study area. SVE cannot be used alone, because it is not effective in cleanup of metals. While this alternative combination is more expensive than containing the contamination with the use of a cap, however, use of a cap alone may not fully address the inhalation risk posed by soil vapor. Combining SVE and a cap is more expensive than combining SVE and excavation. Finally, the use of a cap on the property would limit the potential future reuse of the property.

This proposed alternative addresses the current risk posed to an adjacent resident, and also addresses the risk to any future resident, should the MMC property revert to a residential parcel.

Estimated Cost: $2.2 million.

DMC Study Area. EPA proposes to address contamination in overburden (shallow) groundwater through Alternative DMC GW-5 Soil Excavation and Off-site Disposal. This alternative requires excavation of the most contaminated areas on the property which are providing a risk to human health and appear to be providing an ongoing groundwater contamination source. Excavated soil will be shipped off-site to an approved disposal facility. Institutional controls will be required to prevent construction of new structures without proper controls to mitigate inhalation risk. Institutional controls will also be required to restrict construction activities to protect the health of future construction workers.

Of the alternatives contemplated for the DMC Study Area, excavation and off-site disposal is the only alternative expected to reduce the risk in a relatively short time frame (less than the 50-100 year estimates associated with other alternatives). This alternative is also the most reliable option if all contaminated soils are removed. Mass removal may also have the additional benefit of reducing overall contaminant levels over time. As required by EPA's Technical Impracticability Guidance for the site-wide groundwater, this alternative will also remove source areas to the maximum extent practicable and remove any soils exceeding CT Remediation Standard Regulation Pollutant Mobility Criteria, which criteria are designed to protect groundwater. While every alternative is expected to reduce contaminant concentrations in overburden groundwater over time, no alternative can feasibly remove all residual DNAPL in overburden in a timely and cost-effective manner.

Estimated Cost: $3.2 million.

Site-Wide Groundwater Study Area. For the overall area of groundwater contamination, EPA looked at two sets of remedial alternatives. One set addresses provision of an alternate water supply to address the risk to human health from ingestion of groundwater. Another set of alternatives specifically addresses the potential cleanup of the source zone and dissolved plume in groundwater. These alternatives are discussed separately below.

Site-Wide Groundwater Study Area - Alternate Water Supply. EPA proposes to address contamination in site-wide groundwater through Alternative AWS-2 Connection to Middletown Water Distribution System. This alternative would eliminate all current and future risk to human health from ingestion of groundwater, and provide a permanent source of drinking water to all residences currently affected by groundwater contamination and a buffer zone of residences located near the contaminated area. Based on previous studies done for the Town of Durham, it appears that the Middletown Water System has adequate capacity to serve the Superfund site. A connection to the Middletown Water System may also have the advantage of providing flexibility to address other contaminated areas in the Town of Durham north of the site and avoiding locating a source well in or near contaminated areas.

While the Middletown Water System may also have adequate capacity to provide water service to other portions of town, as well as fire protection, the alternative analyzed in the Feasibility Study was limited to providing water service only to the Superfund site for drinking water purposes. With respect to fire protection, the Feasibility Study does provide a breakout of additional costs that would be required to provide fire protection, including greater capacity piping and associated pumping stations, as well as the added cost for hydrants.

This alternative provides a cost estimate that includes bringing the water main into the Town of Durham and down into the Superfund site area. Cost estimates include all costs associated with hookup of individual homes, including abandonment of on-site private drinking water wells and implementation of institutional controls to prevent drilling and use of future wells in the area. EPA's authority does not include providing funding of the actual supply of water to individual homeowners; this cost would be borne by the homeowners. This alternative also breaks out a separate cost for hooking up the F.W. Strong School to the water line. While the Strong School was previously using an on-site well, filtered to remove groundwater contamination, as of August 2004, it is now using a clean source of water from the District 13 Consolidation well system. This system uses wells at the Coginchaug Regional High School and the Korn Elementary School that are upgradient of the Durham Meadows site.

Two other water supply alternatives are provided in the Feasibility Study. One alternative contemplates providing an alternate water supply from an in-town source of water from an undetermined well location. This is a possible alternative as it would also eliminate all current and future risk to human health from ingestion of groundwater. When EPA began evaluating this alternative, however, adequate data was not available to determine a definitive well source in Town. The Feasibility Study therefore presents this alternative to include installation and development of a new groundwater supply, assumed to be upgradient to the north and east of the Study Area, although a specific supply location was not investigated. At this time, there are a variety of existing well locations that could possibly be further investigated as potential sources, including but not limited to the Durham Fairgrounds wells, the DMC cooling water well, a well at the Parsons Manufacturing Company, or other potential well locations within the Town of Durham. The Durham Fairgrounds wells to the south west of the Study Area are currently being investigated by the Town of Durham as a potential source for the Durham Center water system; a pump test will be scheduled this summer. The DMC cooling water well #2 may have capacity to provide an adequate source of water for the Study Area, although there is no information available to confirm this. A well located at the Parsons Manufacturing Company may reportedly have enough capacity as well. The Parsons and DMC wells are both currently contaminated, however, and would require treatment prior to distribution for drinking water purposes. The need for treatment would increase the cost estimate for this alternative. Federal and State agencies may also prefer clean water supply options over contaminated sources. Based on the current capacity uncertainties and the presence of contamination, EPA is not currently recommending providing an alternate water supply from an in-town source of water from a local well. However, EPA strongly encourages comments from the public regarding the use of an in-town source of water for an alternate water supply.

Another alternative provides for point of use treatment. This alternative provides for continued carbon filtration and monitoring of affected homes, with enhancements necessary to address certain contaminants that are not as effectively captured with standard filtration systems. The number of filters, monitoring, and scheduled change out is increased for homes affected by 1,4-dioxane. Additional treatment systems are also provided for homes affected by metals. The cost estimate for this alternative was lower than the other alternatives, but there is more uncertainty associated with the ability to fully remove 1,4-dioxane with the proposed enhancements. Because of the uncertainties associated with 1,4-dioxane removal, as well as certain VOC breakdown products (vinyl chloride), this alternative also includes a contingency to provide bottled water to a certain number of homes, as necessary.

EPA's recommendation is for alternative AWS-2 Connection to Middletown Water Distribution System.

Estimated Cost: $7.0 million.

Site-wide Groundwater - Source Zone & Dissolved Plume. For the overall area of site-wide groundwater contamination, alternatives to fully restore the groundwater were screened out. It is not technically practicable to clean up the groundwater to drinking water standards in a reasonable amount of time. Due to the persistence of contamination observed since the 1980's, and the extensive fractured bedrock in the area, it is expected that certain areas of the plume would not be able to be restored within several hundred years.

EPA therefore conducted a technical impracticability evaluation to assess whether part or all of the groundwater plume could be cleaned up within a reasonable amount of time, and by what method.

The Feasibility Study separates the overall site-wide groundwater plume into two components: the source zone and the dissolved plume. The source zones are areas at and around the two companies where it is very likely that residual dissolved non-aqueous phase liquid ("DNAPL") exists in the till at MMC and DMC as well as in fractured bedrock. There are currently no available technologies that are known to be effective in restoring DNAPL zones in complex heterogeneous geologic environments to drinking water quality in a reasonable time frame. The source zone alternatives were therefore limited only to taking no action, or using groundwater extraction for containment purposes only.

The dissolved plume surrounds the source zones where groundwater flowing through residual or pooled DNAPL causes dissolution of DNAPL in to a larger area of groundwater contamination. The DNAPL is considered a continuous source of contamination because the dissolution process is slow. A dissolved plume attached to an area of high concentration that has persisted for several years can be viewed as evidence of a continuous source.

To address both the source zone and the dissolved plume, EPA is proposing a combination of alternatives, SZ-1 No Action for the source zone, and DP-4 Limited Action for the dissolved plume, with a contingency to implement alternative SZ-2 Groundwater Extraction for Hydraulic Containment if it is determined that the overall plume or source zone is spreading or migrating beyond its current general boundary. These alternatives are being proposed in combination with a proposed Technical Impracticability Waiver of the applicable or relevant and appropriate environmental requirements (ARARs) that would normally require cleanup of the groundwater to meet drinking water standards. This combination is also dependent on the provision of an alternate public water supply, and would also require institutional controls to prohibit future use of groundwater in this area.

In this proposed combination, EPA would implement a monitoring well network within and outside of the current known boundaries of the overall groundwater plume. The purpose of this network would be to better define the outer extent of the Technical Impracticability zone, and provide long term monitoring to ensure the plume does not migrate to areas that are currently not affected by groundwater contamination.

In the first instance, EPA is proposing that no active engineering remedy be implemented to contain the plume. Based on monitoring data available as early as the 1980's, the plume appears to be in steady state and is not expected to migrate. It may be difficult to implement a groundwater containment system in a fractured bedrock environment. There is, however, no other feasible alternative beyond groundwater containment should the plume start to migrate. Therefore, as a contingency against future migration of the plume, the overall groundwater remedy will require a contingency for implementing this containment system if it is determined that plume migration is indeed occurring.

Estimated Cost: $434,000
(The estimated cost for the groundwater extraction containment alternative is $8.7 million.)

Additional Areas Requiring Investigation. Based upon the potential future indoor air risks found at both the MMC and DMC Study Areas, there is a potential, at other locations, for current or future exposures through volatilization of organic compounds. During remedial design there will be further delineation of the area posing potential indoor air risks on or outside of the MMC and DMC Study Areas by further characterization, including the collection of shallow groundwater data. If there are unacceptable risks, then further actions will be taken to address such risks, including without limitation, sub-slab depressurization systems and institutional controls on vacant properties or portions of properties, in accordance with EPA and CT DEP requirements.

As a contingency measure only, the Feasibility Study presents a per-home cost estimate for addressing potential vapor intrusion into area homes. Two separate estimates are provided. One estimate addresses the cost of installing a system in a home with a slab basement, and another estimate addresses the more significant cost of installing a system in a home with a dirt floor basement and fieldstone walls. At this point in time, it is unclear whether any area homes will require any such system.

EPA's Recommendation for the Overall Remedy:

MMC Study Area $2.2 million.
DMC Study Area $3.2 million.
Site-Wide Groundwater - Alternative Water Supply $7.0 million.
Site-Wide Groundwater - Source & Plume $434,000

Estimated Cost Total: $12,834,000.
(Contingency for Groundwater Containment SZ-2: $8.7 million.)

The preferred alternative is expected to be the final remedial action for the site.

Why Does EPA Recommend this Proposed Cleanup Plan?

Based on current information, EPA recommends this proposed cleanup plan because it is cost-effective yet still protective of human health and the environment. EPA believes the proposed cleanup plan achieves the best balance among the criteria used by EPA to evaluate alternatives. The proposed cleanup provides both short-term and long-term protection of human health and the environment, attains all Federal and State applicable or relevant and appropriate environmental requirements (ARARs) where it is technically practicable to do so, reduces the volume and mobility of contaminated soil and sediment and utilizes permanent solutions to the maximum extent practicable. EPA expects the preferred alternative to satisfy the following statutory requirements of CERCLA Section 121(b): (1) be protective of human health and the environment; (2) comply with ARARs, except as described in this Proposed Plan: (3) be cost-effective; (4) use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (5) satisfy the preference for treatment as a principal element or justify not meeting the preference.

Potential Impacts to the Community

The proposed cleanup plan as described above could potentially have the following impacts on the community:

Air Quality: Excavation of contaminated soil will be required at both facilities. Air monitoring and other protections will be implemented to protect workers and ensure that the surrounding neighborhood air quality is not impacted. Dust suppression methods will be employed as necessary.

Truck Traffic: Truck traffic will be necessary during the excavation and off-site disposal of soil. EPA will work with the community to determine the best way to minimize traffic concerns and will notify the community before this activity begins.

Construction Impacts: Construction of water mains and service connections are not expected to result in site-related exposure risks to the local community. Construction to install water mains and service connections may have an impact on local traffic and short term impacts to affected residential homes. EPA will work with the community to minimize these impacts to the extent possible.

EPA considers a full range of options to clean up a Superfund site before selecting a remedy. Many options are screened out early in the process because site-specific conditions render them ineffective and/or technically or administratively infeasible. Others are eliminated because they are cost prohibitive to implement. The options, or cleanup alternatives, that survived the initial screening and were considered for the Durham Meadows site are summarized below. For consistency, names and numbers of the remedial alternatives presented below remain the same as those used in the Feasibility Study (FS). Alternatives are presented by Study Area (see pages 15 - 20).

WETLANDS AND FLOODPLAINS

The Durham Meadows Superfund site, specifically, a portion of the Durham Manufacturing Company property, contains wetlands. Section 404 of the Clean Water Act and Executive Order 11990 (Protection of Wetlands) require a determination that federal actions involving dredging and filling activities or activities in wetlands minimize the destruction, loss or degradation of wetlands and preserve and enhance the natural and beneficial values of wetlands. EPA has determined that there is no actionable ecological risk at the site, therefore none of the cleanup alternatives specifically involves actions to cleanup wetlands areas. EPA has determined it is unlikely that any of the proposed cleanup alternatives will involve activity that will impact wetlands areas at or around the site. If, however, as part of future design activities, EPA determines that there is no practical alternative to conducting work in wetlands, EPA will then minimize potential harm or avoid adverse effects to the extent practical. Best management practices will be used to minimize adverse impacts on the wetlands, wildlife and its habitat. Damage to these wetlands would be mitigated through erosion control measures and proper regrading and revegetation of the impacted area with indigenous species. If the loss of wetlands areas occurs, wetlands would be restored or replicated consistent with the requirements of the federal and state wetlands protection laws. As required, EPA is seeking comment on this proposed determination.

Portions of the site also are located within the 100-year flood plain. Executive Order 11988 (Protection of Flood plains) requires a determination of whether federal actions will occur in flood plains. If work will occur in flood plains, the federal agency must consider alternatives that avoid adverse impacts to the flood plain. If the only practical alternative requires siting in a flood plain, the agency must then minimize potential harm to the flood plain. EPA has determined it is unlikely that any of the proposed cleanup alternatives will involve activity that will impact flood plain areas at or around the site. If, however, as part of future design activities, EPA determines that there is no practical alternative to conducting work in flood plains, EPA will then minimize potential harm and avoid adverse effects to the extent practical. If the loss of flood plain areas occurs, compensatory flood storage would be provided consistent with the requirements of the federal and state wetlands protection laws. ***As required, EPA is seeking comment on this proposed determination***

REUSE ASSESSMENT

EPA conducted a reuse assessment for the site in order to better determine and develop a more complete understanding of current and potential future uses for the Merriam Manufacturing Company and Durham Manufacturing Company properties. EPA prefers to consider those uses in the selection, design and implementation of the remedy, so long as they do not compromise the protectiveness of the cleanup.

In the case of Durham Manufacturing Company, it is expected that the property associated with the Superfund site will continue being used for its current purpose. For the property where Merriam Manufacturing Company was formerly located, there appears to be a range of reasonably anticipated future land uses, due to current zoning regulations. The Feasibility Study considered the range of reasonably anticipated future land uses during the development of remedial action cleanup objectives; the remedy selection process concluded that future use of the property for residential purposes was the most conservative assumption. The cleanup remedy may preclude the immediate redevelopment of the property for any use, and there may be land use and/or groundwater use restrictions associated with the remedy.

The Draft Reuse Assessment is available as part of the Administrative Record for the site, and ***EPA would like to hear any comments on this document as well.***

TECHNICAL IMPRACTICABILITY

Restoration of contaminated groundwater is one of the primary objectives of the Superfund program. The National Contingency Plan, which provides the regulatory framework for the Superfund program, states that: "EPA expects to return usable ground waters to their beneficial uses wherever practicable, within a time frame that is reasonable given the particular circumstances of the site" (NCP section 300.430(a)(1)(iii)(F)). Generally, restoration cleanup levels are established by applicable or relevant and appropriate requirements (ARARs), such as the use of Federal or State standards for drinking water quality. Cleanup levels protective of human health and the environment are identified by EPA where no ARARs for particular contaminants exist.

Experience has shown, however, that restoration to drinking water quality may not always be achievable due to the limitations of available remediation technologies. EPA, therefore, must evaluate whether groundwater restoration at Superfund sites is attainable from an engineering perspective. Factors that can inhibit groundwater restoration include hydrogeologic factors and contaminant-related factors, such as the presence of dissolved non-aqueous phase liquids (DNAPL).

EPA conducted an evaluation to determine whether it was technically practicable to clean up the groundwater in the area of the site within a reasonable time frame. The conclusion was that restoration of both the overburden and bedrock aquifers in a reasonable time frame is not practical for the following reasons:

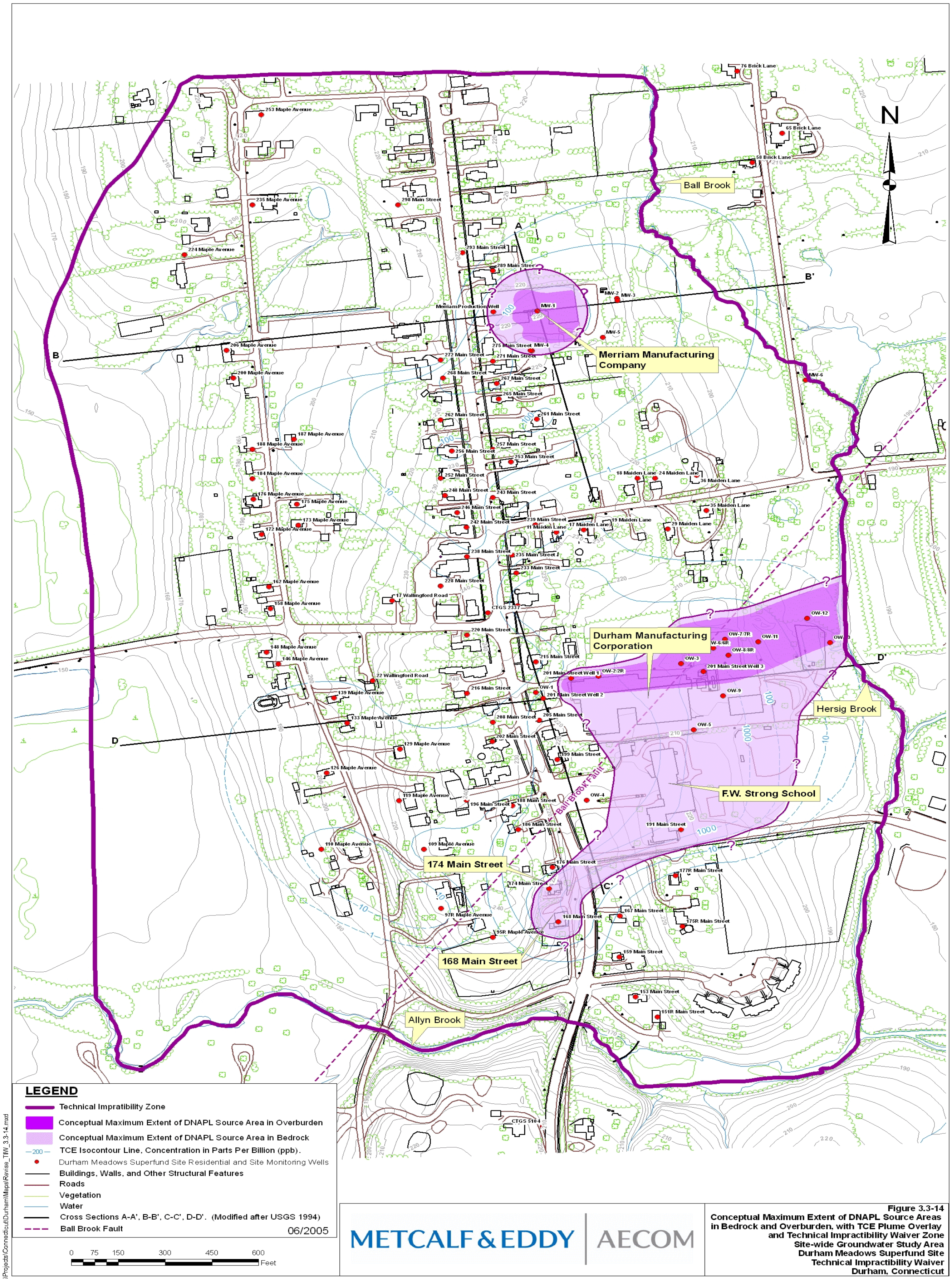
- ❖ The presence of chlorinated solvent contamination in residential areas located several hundred feet from the release areas demonstrates widespread bedrock contamination.
- ❖ A significant and costly investigation would be required to characterize the vertical extent of contamination, and such characterization would likely be inconclusive due to the complex nature of fractured bedrock. Therefore, it would be difficult to design an optimal remediation system to restore bedrock groundwater.
- ❖ Removal of DNAPL from the overburden aquifer and/or the fractured sedimentary bedrock, and restoration of groundwater within a reasonable time-frame (e.g. less than 100 years) is extremely difficult, if not impossible.
- ❖ There are currently no available technologies that are known to be effective in restoring DNAPL zones in complex heterogeneous geologic environments to drinking water quality in a reasonable time frame.

For these reasons, a Technical Impracticability Waiver of ARARs is warranted under NCP Section 300.430(f)(1)(ii)C)(3) and EPA's Technical Impracticability Guidance for groundwater. EPA is proposing that the groundwater zone over which the technical impracticability zone applies encompasses all areas in the overburden and bedrock aquifers that are currently or conceivably could be impacted by contamination emanating from the site. The depth of the technical impracticability waiver zone is considered to be at least the depth of the conceptual maximum extent of DNAPL.

To address both the source zone and the dissolved plume, EPA is proposing a combination of alternatives, SZ-1 No Action for the source zone, and DP-4 Limited Action for the dissolved plume, as previously described, with a contingency to implement alternative SZ-2 Groundwater Extraction for Hydraulic Containment if it is determined that the overall plume or source zone is spreading or migrating beyond its current general boundary. These alternatives are being proposed in combination with a proposed Technical Impracticability Waiver ARARs that would normally require cleanup of the groundwater to meet drinking water standards. This combination is also dependent on the provision of an alternate public water supply, and would also require institutional controls to prohibit future use of groundwater in this area.

EPA is inviting comment on the proposed Technical Impracticability Waiver. Further details are available in the Draft Final Technical Impracticability Evaluation Report, dated June 2005.

FIGURE 4


N
Ball Brook
Merriam Manufacturing Company
Merriam Production Well
Durham Manufacturing Corporation
Hersig Brook
F.W. Strong School
174 Main Street
168 Main Street
Allyn Brook
Ball Brook Fault
A
B
B'
C'
D
D'
LEGEND
Technical Impratibility Zone
Conceptual Maximum Extent of DNAPL Source Area in Overburden
Conceptual Maximum Extent of DNAPL Source Area in Bedrock
TCE Isocontour Line, Concentration in Parts Per Billion (ppb).
Durham Meadows Superfund Site Residential and Site Monitoring Wells
Buildings, Walls, and Other Structural Features
Roads
Vegetation
Water
Cross Sections A-A', B-B', C-C', D-D'. (Modified after USGS 1994)
Ball Brook Fault
06/2005
0 75 150 300 450 600
Feet
G:\Projects\Connecticut\Durham\Maps\Revise_TIW_3.3-14.mxd
METCALF & EDDY | AECOM
Figure 3.3-14
Conceptual Maximum Extent of DNAPL Source Areas
in Bedrock and Overburden, with TCE Plume Overlay
and Technical Impractibility Waiver Zone
Site-wide Groundwater Study Area
Durham Meadows Superfund Site
Technical Impractibility Waiver
Durham, Connecticut

Other Cleanup Alternatives Considered for the Durham Meadows Superfund site

A Feasibility Study reviews the alternatives that EPA considers for cleanup at a Superfund site. EPA evaluated the following alternatives for the Durham Meadows Superfund site. Alternatives are presented by Study Area. *EPA's preferred alternatives are italicized in the chart below.*

MMC Study Area - Soil

Alternative MMC S-1: No Action.
Alternative MMC S-2: Containment.
Alternative MMC S-3: Excavation (4 foot depth) and Off-site Disposal.
Alternative MMC S-4: Soil Vapor Extraction.

MMC Study Area - Soil Vapor

Alternative MMC SV-1: No Action.
Alternative MMC SV-2: Excavation (8 foot depth) and Off-Site Disposal.
Alternative MMC SV-3: Soil Vapor Extraction.

MMC Study Area - Combined Soil & Soil Vapor Alternatives

Combination of Alternatives S-3 and SV-2, Excavation and Off-site Disposal for both Soil and Soil Vapor.
Combination of Alternatives S-3 Excavation and Off-site Disposal and SV-3 Soil Vapor Extraction.
Combination of Alternatives S-2 Containment and SV-3 Soil Vapor Extraction.

DMC Study Area - Overburden Groundwater

Alternative DMC GW-1: No Action.
Alternative DMC GW-2: Containment
Alternative DMC GW-3: Multi Phase Extraction
Alternative DMC GW-4: In Situ Chemical Oxidation
Alternative DMC GW-5: Excavation and Off-site Disposal

Site-wide Groundwater Study Area - Alternate Water Supply

Alternative AWS-1: No Action.
Alternative AWS-2: Connection to Middletown Water Distribution System.
Alternative AWS-3: Development of New Groundwater Source and Water Distribution System.
Alternative AWS-4: Point of Use Treatment

Site-wide Groundwater - Source Zone (SZ) and Dissolved Plume (DP)

Alternative SZ-1: No Action.
Alternative SZ-2: Groundwater Extraction - Hydraulic Containment for Source Zone.

Alternative DP-1: No Action.
Alternative DP-2: Monitored Natural Attenuation for the Dissolved Plume.
Alternative DP-3: Groundwater Extraction - Restoration for the Dissolved Plume.
Alternative DP-6: Monitoring of the Dissolved Plume.

MMC Study Area - Soil

Alternative MMC S-1: No Action.
Alternative MMC S-2: Containment.
Alternative MMC S-3: Excavation (4" depth) and Off-site Disposal.
Alternative MMC S-4: Soil Vapor Extraction.

No Action

Alternative MMC S-1

This alternative is required to provide a baseline for comparison (i.e., what happens if nothing is done). The site would remain as is. Soil contamination would remain on site.
Estimated cost: none.

Containment

Alternative MMC S-2

Impermeable cap, with possible consolidation on site.
Estimated cost: $2.7 million.

(The Feasibility Study presents a variety of cost estimates assuming different scenarios for the lateral extent of the property that requires capping. These cost estimates range from $1.3 to $2.7 million. The $2.7 million estimated cost represents the scenario that is expected to be the most likely to address all risk and achieve regulatory requirements.)

Excavation & Off-site Disposal

Alternative MMC S-3

Contaminated soils would be excavated and sent off-site for disposal.
Estimated cost: $2.6 million.

(The Feasibility Study presents a variety of cost estimates assuming different scenarios for the lateral extent and depth to which excavation is required, with a maximum depth of 4'. These cost estimates range from $332,000 to $7.6 million. The $2.6 million estimated cost represents the scenario that is expected to be the most likely to address all risk and achieve regulatory requirements in soil.)

Soil Vapor Extraction

Alternative MMC S-4: Soil Vapor Extraction.

Soil Vapor Extraction would be implemented to reduce VOC concentrations in soils. SVE does not treat other types of contaminants (i.e., PAHs and metals).
Estimated cost: $505,000.

Looking east from Main Street to MMC property

Entrance to MMC property; access limited by fence.

MMC Study Area
Soil Vapor

No Action

Alternative MMC SV-1

This alternative is required to provide a baseline for comparison (i.e., what happens if nothing is done). The site would remain as is. Soil vapor contamination would remain on site.

Estimated cost: none.

Excavation & Off-site Disposal

Alternative MMC SV-2

Contaminated soils would be excavated and disposed off site, with a focus on removing all TCE contaminated soils.

Estimated cost: $3.8 million

(The Feasibility Study presents a range of cost estimates assuming different scenarios for the lateral extent and depth to which excavation is required, with a maximum depth of 8'. The cost estimates range from $2.1 million to $3.8 million. The $3.8 million estimated cost represents the scenario that is expected to be the most likely to address all risk and achieve regulatory requirements in soil.)

Soil Vapor Extraction

Alternative MMC SV-3.

Soil Vapor Extraction would be implemented to reduce VOC concentrations in soils and soil vapor. SVE does not treat other types of contaminants (i.e., PAHs and metals).

Estimated cost: $494,000.

MMC Study Area
Combined Alternatives
Soil & Soil Vapor

Excavation & Off-site Disposal for BOTH Soil and Soil Vapor

Combination of Alternatives S-3 and SV-2

Excavation alone would be implemented to address contaminants in both soil and soil vapor.

Estimated cost: $4.9 million

Excavation & Off-site Disposal AND Soil Vapor Extraction

Combination of Alternatives S-3 and SV-3

SVE would be implemented prior to excavation to reduce the volume and depth of VOC contamination requiring excavation.

Estimated cost: $2.2 million.

This is the preferred alternative for the MMC Study Area, as previously described.

Containment AND Soil Vapor Extraction

Combination of Alternatives S-2 and SV-3 Soil Vapor Extraction.

Impermeable cap, with SVE to address soil vapor contamination.

Estimated cost: $3.0 million

(The Feasibility Study presented a range of cost estimates for alternative S-2 Containment. EPA selected the estimate expected to be most likely to address all risk and regulatory requirements, and that estimate is incorporated in this total.)

DMC Study Area - Overburden Groundwater

Alternative DMC GW-1: No Action.
Alternative DMC GW-2: Containment
Alternative DMC GW-3: Multi Phase Extraction
Alternative DMC GW-4: In Situ Chemical Oxidation
Alternative DMC GW-5: Excavation and Off-site Disposal

No Action

Alternative DMC GW-1

This alternative is required to provide a baseline for comparison (i.e., what happens if nothing is done). The site would remain as is. Overburden groundwater contamination would remain on site.

Estimated cost: none.

Containment

Alternative DMC GW-2

An extraction and treatment system would contain and treat overburden groundwater.

Estimated cost: $4.9 million

(The Feasibility Study presents a range of cost estimates assuming different scenarios for the type of contamination - including heavy metals and 1,4-dioxane -- that requires treatment. The cost estimates range from $2.8 to $4.9 million. The $4.9 million estimated cost represents the scenario that is expected to be the most likely to address all risk and achieve regulatory requirements.)

Multi Phase Extraction

Alternative DMC GW-3: Multi Phase Extraction

A combination of groundwater extraction and treatment and vapor extraction would treat overburden groundwater.

Estimated cost: $4.9 million

(The Feasibility Study presents a range of cost estimates assuming different scenarios for the type of contamination that requires treatment. The cost estimates range from $2.9 to $4.9 million. The $4.9 million estimated cost represents the scenario that is expected to be the most likely to address all risk and achieve regulatory requirements.)

In Situ Chemical Oxidation

Alternative DMC GW-4: In Situ Chemical Oxidation

Injection of an oxidizing agent into wells would treat overburden groundwater.

Estimated cost: $1.8 million

Excavation & Off-site Disposal

Alternative DMC GW-5: Excavation and Off-site Disposal

Excavation of contaminated soil in hot spot areas and disposal off-site.

Estimated cost: $3.2 million

(The Feasibility Study presents a variety of cost estimates assuming different scenarios for the lateral extent and depth to which excavation is required. The cost estimates for hot spot areas range from $1.9 to $3.2 million, and an estimate of $8.1 million assumes excavation of the entire area of contaminated overburden groundwater as a worst-case scenario. The $3.2 million estimated cost represents the scenario that is expected to be the most likely to address all risk and achieve regulatory requirements in soil.)

<u>This is the preferred alternative for the DMC Study Area, as previously described.</u>

Site-wide Groundwater Study Area
Alternative Water Supply

No Action

Alternative AWS-1

This alternative is required to provide a baseline for comparison (i.e., what happens if nothing is done). The site would remain as is.

Estimated cost: none

Connection to Middletown Water Distribution System

Alternative AWS-2

This alternative provides for a water line extension from the City of Middletown into the Superfund site area. All affected residents, including a buffer zone of residences near the contaminated area, would be connected to the water line.

Estimated cost: $7.0 million

This is the preferred alternative for the alternate water supply, as previously described.

Development of New Groundwater Source and Water Distribution System

Alternative AWS-3

This alternative is similar to AWS-2, except that the source of public water is an in-town well, location to be determined. A variety of other existing well locations could possibly be further investigated as potential sources.

Estimated cost: $6.6 million

Point of Use Treatment

Alternative AWS-4

This alternative provides for continued carbon filtration on individual private wells, along with additional filters and/or treatment systems for wells with contaminants not effectively removed by filters.

Estimated cost: $7.2 million

Filtered residential wells impacted by contaminants from the superfund site are sampled on regular basis in Durham.

Site-wide Groundwater Study Area
Source Zone (SZ) and Dissolved Plume (DP)

No Action

Alternative SZ-1

This alternative is required to provide a baseline for comparison (i.e., what happens if nothing is done). The site would remain as is.

Estimated cost: none

Groundwater Extraction - Hydraulic Containment for Source Zone

Alternative SZ-2

This alternative utilizes a groundwater extraction and treatment system to contain the DNAPL source zone in bedrock. This alternative is for containment only; there is no available alternative to fully restore the contaminated groundwater plume in a reasonable amount of time.

Estimated cost: $8.7 million

<u>This alternative is incorporated into EPA's preferred alternative as a contingency, only to be implemented if it is determined that the groundwater plume is migrating.</u>

No Action

Alternative DP-1

This alternative is required to provide a baseline for comparison (i.e., what happens if nothing is done). The site would remain as is.

Estimated cost: none

Monitored Natural Attenuation for the Dissolved Plume

Alternative DP-2

This alternative provides for natural attenuation to eventually reduce concentrations of contaminants in groundwater in the dissolved plume only. No active treatment is associated with this alternative. This alternative does not address the DNAPL source zone.

Estimated cost: $1.9 million

Groundwater Extraction - Restoration for the Dissolved Plume

Alternative DP-3

This alternative uses a groundwater extraction and treatment system to actively treat the dissolved plume area. This alternative does not address the DNAPL source zone.

Estimated cost: $8.5 million

Monitoring of the Disolved Plume

Alternative DP-6

This alternative uses a monitoring well network to ensure that migration of contaminated groundwater does not occur.

Estimated cost: $434,000

This is the preferred alternative, as previously described, in combination with Alternative SZ-1, No Action for the Source Zone. Alternative SZ-2, Groundwater Extraction for Hydraulic Containment, will also be specifically provided as a contingency, in the event that groundwater plume migration does occur.

This combination of alternatives is provided in conjunction with the provision of an alternate water supply to area residents, as well as a proposed technical impracticability waiver for both the source zone and dissolved plume areas.

How Does EPA Choose a Final Cleanup Plan?

EPA uses nine criteria to compare alternatives and select a final cleanup plan or remedy that meets the statutory goals of protecting human health and the environment, maintaining protection over time and minimizing contamination. These nine criteria make up the assessment process used for all Superfund sites. The following list highlights these nine criteria and some questions EPA must consider in selecting a final cleanup plan. Additional discussion of these nine criteria can be found in Section 6 of the Durham Meadows Feasibility Study, which is part of the Administrative Record. The Administrative Record, located in the Durham Public Library and at the EPA office in Boston, is a collection of documents generated during the investigation of the Durham Meadows site that form the basis for selection of the cleanup action. Additional information about the Durham Meadows Superfund site is also available on the EPA New England website: www.epa.gov/ne/superfund/sites/durham.

Threshold Criteria

1. ***Overall protection of human health and the environment***: Will the alternative protect human health and plant and animal life on and near the area? The chosen cleanup plan must meet this criterion.

2. ***Compliance with applicable or relevant and appropriate requirements (ARARs)***: Does the alternative meet all pertinent federal and state environmental statutes, regulations, and requirements? The chosen cleanup plan must meet this criterion, unless a waiver is justified.

Balancing Criteria

3. ***Long-term effectiveness and permanence***: How reliable will the alternative be at long-term protection of human health and the environment? Is contamination likely to present a potential risk again?

4. ***Reduction of toxicity, mobility or volume through treatment***: Does the alternative incorporate treatment to reduce the harmful effects of the contaminants, their ability to spread, and the amount of contaminated material present?

5. ***Short-term effectiveness:*** How soon will risks be adequately reduced? Are there short-term hazards to workers, the community, or the environment that could occur during the cleanup process?

6. ***Implementability***: Is the alternative technically and administratively feasible? Are the goods and services needed to implement the alternative (e.g., treatment machinery, space at an approved disposal facility) readily available?

7. ***Cost***: What is the total cost of constructing and operating the alternative? Costs presented in this document represent the present worth costs of construction, operations, and monitoring for the anticipated lifetime of the alternative.

Modifying Criteria

8. ***State acceptance***: Do state environmental agencies agree with the recommendations? What are their preferences and concerns?

9. ***Community acceptance***: What suggestions or modifications do residents of the community offer during the comment period? What are their preferences and concerns?

Of these nine criteria, protection of human health and the environment and compliance with ARARs are considered threshold criteria that must be met for a candidate cleanup alternative to be selected. The next five criteria, called balancing criteria, are used to evaluate and compare the elements of the alternatives that meet the threshold criteria. This comparison evaluates which alternative provides the best balance of trade-offs with respect to the balancing criteria. State and community acceptance are considered modifying criteria factored into a final balancing of all criteria to select a remedy. Consideration of state and community comments may prompt EPA to modify aspects of the preferred alternative or decide that another alternative provides a more appropriate balance.

Evaluation of Alternatives

EPA uses nine criteria to balance the advantages and disadvantages of various cleanup alternatives. As described below, EPA has evaluated how well each of the cleanup alternatives meets the first seven criteria. Evaluation for each criteria is done by study area. Once formal comments from the state and the community are received, EPA will select the final cleanup plan.

Overall Protection of Human Health and the Environment

MMC Study Area: The no action alternatives for soil and soil vapor (S-1 and SV-1) would be the least protective of human health and the environment because there would be no cleanup of the site and unacceptable risks to human health would remain.

The Containment Alternative (S-2), would provide overall protection of human health and the environment by preventing direct exposure to materials that present an unacceptable risk with the use of an impermeable cap and institutional controls; ongoing maintenance of the cap would be required to ensure continued protectiveness. The Excavation and Off-site Disposal Alternative for soil (S-3), would also provide overall protection of human health risks by preventing direct exposure to materials by removing contaminated soil. Both of these alternatives would provide some measure of protection, but may not fully address inhalation risks from soil vapor contamination. Institutional controls would be required to restrict use. The Excavation Alternative for soil vapor (SV-2), provides for deeper excavation, just in the areas with soil vapor contamination, to specifically address this issue. The Soil Vapor Extraction Alternatives for soil and soil vapor respectively (S-4 and SV-3), would effectively eliminate risks to human health from direct contact with TCE in soil and inhalation of TCE in soil vapor. SVE alone, however, cannot address current and future risks due to PAHs and metals in soil.

Combinations of the above alternatives were contemplated to address unacceptable risks from contaminants in both soil and soil vapor. Combining the Containment (S-2) and Soil Vapor Extraction (SV-3) alternatives would prevent direct exposure to human health and address inhalation risk, although the cap would require ongoing maintenance to ensure continued protectiveness. Combining Excavation alternatives for both soil and soil vapor (S-3 and SV-2), would address all contaminants. By combining Excavation for soil (S-3) and Soil Vapor Extraction (SV-3), SVE would be implemented prior to excavation to reduce the volume and depth of VOC contamination requiring excavation. The latter two combinations (S-3 with SV-2, and S-3 with SV-3) provide the greatest degree of overall protection.

DMC Study Area: The No Action Alternative (GW-1) would be the least protective of human health and the environment because there would be no cleanup of the site and unacceptable risks to human health would remain.

For all of the other alternatives contemplated for this Study Area, the possible presence of DNAPL and possible contamination under buildings and utilities increases the expected time frame for reduction in concentrations. All alternatives are expected to leave some residual DNAPL in overburden; it is not technically practicable to clean up this DNAPL. Institutional controls are required in conjunction with these alternatives to prevent construction workers from coming into contact with contaminated groundwater, and to prevent future development that does not address volatilization issues.

The Hydraulic Containment Alternative (GW-2) would protect human health by extracting and treating overburden groundwater to eliminate the risk posed to construction workers through direct contact and to a future resident through volatilization of contaminants from groundwater. However, reduction of contaminants is expected to occur over a long period of time (up to 100 years). The Multi Phase Extraction Alternative (GW-3) is expected to have similar results as GW-2, except that with the addition of a vapor extraction component, potential contaminant sources in the saturated zone are also reduced, and the time frame for reduction of contaminants may be reduced to 50 years. The In Situ Chemical Oxidation Alternative (GW-4) is expected to reduce contaminant mass, volume and concentration through injection of an oxidizing agent into wells to treat overburden groundwater, however, the time frame for reduction of contaminants is assumed to be 50 years due to low permeability of overburden.

The Excavation and Off-site Disposal Alternative (GW-5) would protect human health by excavating contaminated soil in hot spot areas to eliminate the risk posed to construction workers through direct contact and to a future resident through volatilization of contaminants from groundwater. Elimination of hot spot areas provides the greatest degree of overall protection that is technically practicable at this study area. Reduction of contaminants in overburden groundwater is expected to take up to 50 years. As stated above, the excavation of hot spot areas will also remove a source of contamination to groundwater.

Site-wide Groundwater Study Area - Alternate Water Supply: The No Action Alternative (AWS-1) would be the least protective of human health and the environment because unacceptable risks to human health would not be addressed. The Connection to Middletown Water Distribution System Alternative (AWS-2), Development of New Groundwater Source and Water Distribution System Alternative (AWS-3), would both protect human health by providing an alternate water supply for all impacted constituents. These alternatives provide the greatest protection of human health by eliminating all current and future risk. The Point of Use Treatment Alternative (AWS-4), protects human health by filtering and/or otherwise treating well water prior to use, and providing contingencies for bottled water should point of use treatment fail. Institutional controls are required for alternatives AWS-2, AWS-3 and AWS-4 to ensure continued protectiveness by preventing use of contaminated groundwater.

Site-wide Groundwater - Source Zone (SZ) and Dissolved Plume (DP): No Action Alternatives (SZ-1 and DP-1), implemented on their own, would be the least protective of human health and the environment because unacceptable risks to human health would not be addressed.

For the **source zone**, Groundwater Extraction - Hydraulic Containment alternative (SZ-2), would increase human health protection by reducing the concentration of contaminants in the associated plume area, although no active cleanup of groundwater is contemplated (containment is the only goal). There is no alternative that can achieve cleanup goals in the source zone.

For the **dissolved plume**, Monitored Natural Attenuation alternative (DP-2), no reduction in risk occurs if implemented on its own. Implemented in conjunction with provision of an alternate water supply and institutional controls, human health protection is increased. Groundwater Extraction - Restoration Alternative (DP-3), would increase human health protection, but is not likely to achieve cleanup goals for 50 years. This alternative is not protective if implemented alone, but increases human health protection if implemented in conjunction with provision of an alternate water supply and institutional controls. Monitoring of the Dissolved Plume Alternative (DP-6), uses a monitoring network to ensure against plume migration. Again, implemented alone, no reduction of risk occurs.

Alternatives were combined to include Monitoring of the Dissolved Plume (DP-6), No Action for the Source Zone (SZ-1), and Groundwater Extraction for Hydraulic Containment Alternative (SZ-2) specifically provided as a contingency, in the event that groundwater plume migration does occur. In conjunction with the provision of an alternative water supply as described in alternatives AWS-2 or AWS-3, as well as a proposed technical impracticability waiver for both the source zone and dissolved plume areas, this combination is protective of human health

Compliance with Applicable or Relevant and Appropriate Environmental Requirements (ARARs)

MMC Study Area: Alternatives S-1 and SV-1, No Action for soil and soil vapor, would not comply with chemical-specific ARARs applicable to the Site. Soil vapor extraction alternatives alone, S-4 and SV-3, would not meet all chemical-specific ARARs. The excavation alternatives, S-3 for soil and SV-2 for soil vapor, if implemented separately, may not meet all chemical specific ARARs for the entire depth of soil.

Alternatives S-2, Containment, and all three combinations of alternatives (S-3 and SV-2, Excavation for both Soil and Soil Vapor; S-3 Soil Excavation and SV-3 Soil Vapor Extraction; S-2 Containment and SV-3 Soil Vapor Extraction) would meet all chemical, location, and action-specific ARARs if properly implemented.

DMC Study Area: Alternative GW-1, No Action, would not comply with chemical-specific ARARs applicable to the Site. All other alternatives, GW-2, GW-3, GW-4 and GW-5, will all meet chemical-specific ARARs over time, ranging from up to 50 years for GW-3, GW-4, and GW-5, to 100 years for GW-2. These alternatives will also all meet location and action-specific ARARs if properly implemented.

Site-wide Groundwater Study Area - Alternate Water Supply: Alternative AWS 1, No Action, would not comply with chemical-specific ARARs. Alternatives AWS-2, AWS-3 and AWS-4 will all achieve chemical-specific ARARs as they relate to water supply only (no actual cleanup of site-wide groundwater occurs with any of these alternatives). These alternatives will comply with location and action-specific ARARs if properly implemented.

Site-wide Groundwater - Source Zone (SZ) and Dissolved Plume (DP): No action alternatives SZ-1 and DP-1 do not comply with chemical-specific ARARs. Alternative SZ-2 would comply with chemical-specific ARARs over time, but only for containment purposes and not for restoration. Alternative DP-2 may achieve chemical-specific ARARs, but likely in a time frame greater than 100 years. Alternative DP-3 may achieve chemical-specific ARARs in a time frame greater than 50 years. Alternative DP-6, implemented alone, does not comply with chemical-specific ARARs.

Alternatives were combined to include DP-6, Monitoring of the Dissolved Plume, Alternative SZ-1, No Action for the Source Zone, and Alternative SZ-2, Groundwater Extraction for Hydraulic Containment, specifically provided as a contingency, in the event that groundwater plume migration does occur. In conjunction with the provision of an alternative water supply as described in alternatives AWS-2 or AWS-3, as well as a proposed technical impracticability waiver for both the source zone and dissolved plume areas, this combination achieves chemical-specific ARARs as they apply to water supply only. A technical impracticability waiver is proposed for ARARs that would normally require cleanup of the groundwater to meet drinking water standards.

Long-Term Effectiveness and Permanence

MMC Study Area: Alternatives S-1 and SV-1, No Action for soil and soil vapor, do not provide any long-term effectiveness or permanence. Soil vapor extraction alternatives alone, S-4 and SV-3, would not remove risks posed by chemicals other than VOCs, and would not address all human health risks. The excavation alternatives, S-3 for soil and SV-2 for soil vapor, if implemented separately, would provide long-term effectiveness and permanence, but only for specific contaminants; residual risks for other contaminants may remain. Alternative S-2 Containment would provide long-term effectiveness and permanence, provided the cap was regularly maintained.

Combining S-2 Containment and SV-3 Soil Vapor Extraction) would provide long-term effectiveness and permanence, provided the cap was regularly maintained. The remaining combinations of alternatives (S-3 and SV-2, Excavation for both Soil and Soil Vapor, and S-3 Soil Excavation and SV-3 Soil Vapor Extraction) would provide the most permanence and long-term effectiveness.

DMC Study Area: Alternative GW-1, No Action, does not provide any long-term effectiveness or permanence. Alternatives GW-2, GW-3, GW-4 and GW-5, will all provide some measure of long-term effectiveness by reducing concentrations of VOCs in both the hot spot areas and the associated plume. However, the likely presence of DNAPL, including residual DNAPL within till fractures, creates the possibility of residual contamination being available for dissolution many years into the future. The alternatives are expected to provide adequate and reliable controls. The possible exception is alternative GW-4, in-situ chemical oxidation, due to the potential for mobilization of metals with certain oxidant and soil types.

Site-wide Groundwater Study Area - Alternate Water Supply: Alternative AWS 1, No Action, does not provide any long-term effectiveness or permanence. Under alternatives AWS-2, AWS-3 and AWS-4, residual risks will remain at the site due to contaminated groundwater. AWS-2 and AWS-3 provide a permanent hookup to an alternative water supply, which would remove the risk to human health from contaminated groundwater.

Site-wide Groundwater - Source Zone (SZ) and Dissolved Plume (DP): No action alternatives SZ-1 and DP-1 do not provide any long-term effectiveness or permanence. Alternative SZ-2 would reduce concentrations of VOCs in both the source zone and indirectly in the dissolved plume, but residual risk from DNAPL will remain at the site for many years into the future. This alternative may effectively manage migration and would require a long term monitoring program, regular maintenance, and institutional controls. Under alternative DP-2, residual risk remains due to contaminated groundwater for a time frame likely greater than 100 years. Alternative DP-3 may minimize migration of contaminated water and reduce the size of the dissolved plume, but residual risk remains for a time frame likely greater than 50 years. Alternative DP-6, implemented alone, includes no controls to reduce contaminant levels.

Alternatives were combined to include DP-6, Monitoring of the Dissolved Plume, Alternative SZ-1, No Action for the Source Zone, and Alternative SZ-2, Groundwater Extraction for Hydraulic Containment, specifically provided as a contingency, in the event that groundwater plume migration does occur. In conjunction with the provision of an alternative water supply as described in alternatives AWS-2 or AWS-3, as well as a proposed technical impracticability waiver for both the source zone and dissolved plume areas, this combination achieves long-term effectiveness and permanence for protection of human health and the environment.

Reduction of Toxicity, Mobility, or Volume Through Treatment

MMC Study Area: The no action alternatives, S-1 and SV-1, do not reduce toxicity, mobility, or volume through treatment. Containment alternative S-2 may reduce toxicity, mobility or volume, although not through treatment. This alternative would reduce the mobility of the chemical contaminants that are placed beneath the cap by preventing water from coming into contact with contaminants. Excavation alternatives S-3 and SV-2 will reduce toxicity, as contaminants above cleanup levels will be removed from the site; this will additionally greatly reduce mobility and volume, but not through treatment (although some materials shipped off-site may require treatment prior to disposal). Soil vapor extraction alternatives, S-4 and SV-3, will reduce toxicity and the overall mass of VOCs in soil through treatment. SVE is an irreversible treatment process for VOCs, by which extracted VOCs are collected on carbon and destroyed during carbon regeneration. Similarly, any alternative combination that includes SVE will satisfy this criteria.

DMC Study Area: Alternative GW-1, No Action, does not reduce toxicity, mobility, or volume through treatment. Alternatives GW-2, GW-3, and GW-4, will all provide some reduction of toxicity, mobility and volume through treatment, however, residual contamination in groundwater will likely be available as DNAPL. Alternative GW-2 will treat extracted groundwater to remove potential DNAPL in a separation process, remove VOCs with air stripping and adsorption, and remove metals by precipitation. Alternative GW-3 is similar to GW-2, but adds vapor phase extraction. Alternative GW-4 would involve installation of wells throughout the area for injection of an oxidizing agent into the ground; the oxidizing agent would permanently break down contaminants to non-hazardous products. Excavation alternative GW-5 will reduce toxicity, as hot spot contaminants will be removed from the site; this will additionally greatly reduce mobility and volume, but not through treatment (although some materials shipped off-site may require treatment prior to disposal).

Site-wide Groundwater Study Area - Alternate Water Supply:

None of the alternatives reduce toxicity, mobility, or volume through treatment. Natural attenuation may eventually reduce the toxicity and volume of contaminants in groundwater. AWS-4 provides some treatment of contaminated groundwater through the use of filters, however this treatment is incidental and for water supply purposes only; this alternative does not provide active remediation of contaminated groundwater.

Site-wide Groundwater - Source Zone (SZ) and Dissolved Plume (DP): No action alternatives SZ-1 and DP-1 do not reduce toxicity, mobility, or volume through treatment. Alternative SZ-2 would reduce toxicity, mobility and volume through treatment of VOCs, SVOCs and metals in both the source zone and indirectly in the dissolved plume; extracted groundwater would be treated to remove DNAPL in separation process, and treated via precipitation and air stripping processes. Advanced oxidation would be required to remove 1,4-dioxane. However, residual contamination in groundwater is expected to persist. Under alternative DP-2, natural attenuation would eventually reduce concentrations of contaminants in groundwater, but no active treatment is contemplated and residual contamination is expected for a time frame likely greater than 100 years. Alternative DP-3 would reduce toxicity, mobility and volume through treatment of VOCs, SVOCs and metals in the dissolved plume via groundwater extraction and treatment, although residual contamination is expected to remains for a time frame likely greater than 50 years. Alternative DP-6, implemented alone, provides no active treatment, although natural attenuation would eventually reduce concentrations of contaminants in groundwater.

Alternatives were combined to include DP-6, Monitoring of the Dissolved Plume, Alternative SZ-1, No Action for the Source Zone, and Alternative SZ-2, Groundwater Extraction for Hydraulic Containment, specifically provided as a contingency, in the event that groundwater plume migration does occur. These alternatives would be implemented in conjunction with the provision of an alternative water supply as described in alternatives AWS-2 or AWS-3, as well as a proposed technical impracticability waiver for both the source zone and dissolved plume areas. No active treatment is contemplated, unless the contingency of SZ-2 for containment is implemented.

Short-Term Effectiveness

MMC Study Area: Because the no action alternatives, S-1 and SV-1, would not require any activities to be conducted, there would be no short-term impacts to the community or on-site workers. The no action alternatives do not reduce risks to human health. Containment alternative S-2 would have some short-term impacts to the community from the construction activities, and dust control measures and air monitoring would be required. Installation of a cap would take less than one year for construction. Excavation alternatives S-3 and SV-2 would also have some short-term impacts to the community from the construction activities, and similar dust control measures and air monitoring would be required. Construction activities related to excavation and off-site disposal would take less than one year. In soil vapor extraction alternatives S-4 and SV-3, air emissions would be monitored to ensure there are no impacts to the community, and monitoring would be required during construction for worker protection. SVE alone would meet remedial action objectives within 5 to 7 years for VOCs alone, but would not address risks from other chemicals.

Combining S-2 Containment and SV-3 Soil Vapor Extraction may increase the efficiency of VOC removal and therefore short-term effectiveness. No additional short term impacts to the community or construction workers are contemplated for the remaining combinations of alternatives.

DMC Study Area: The no action alternative GW-1 doesn't require any activities to be conducted, therefore there would be no short-term impacts to the community or on-site workers; this alternative does not reduce risks to human health. Impacts to the community by alternatives GW-2 and GW-3 will be limited to the construction of a treatment facility. Risks may not be adequately addressed for 100 years for GW-2 and 50 years for GW-3. Minimal risk is posed to the community by alternative GW-4; risks may not be adequately addressed for 50 years. The short-term impacts to the community with alternative GW-5 include a high volume of truck traffic during excavation activities. Dust control may be required and construction workers would be required to have appropriate health and safety training; risks may not be adequately addressed for 50 years.

Site-wide Groundwater Study Area - Alternate Water Supply: The no action alternative AWS-1 doesn't require any activities to be conducted, therefore there would be no short-term impacts to the community or on-site workers; this alternative does not reduce risks to human health. Under alternatives AWS-2 and AWS-3, construction of water mains and service connections are not expected to have a significant impact on the local community or construction workers, with respect to exposure to contamination. Normal construction hazards associated with this type of activity will be mitigated through implementation of safe work practices and compliance with OSHA requirements. Significant environmental impacts are not expected from water supply infrastructure installation. Under alternative AWS-4, installation and monitoring of treatment systems is expected to pose a mild disturbance to the community at large. Although no active cleanup of groundwater is contemplated by alternatives AWS-2, AWS-3 and AWS-4, risks to human health would be addressed immediately upon hookup to an alternate water supply or provision of point of use treatment.

Site-wide Groundwater - Source Zone (SZ) and Dissolved Plume (DP): The no action alternatives SZ-1 and DP-1 don't require any activities to be conducted, therefore there would be no short-term impacts to the community or on-site workers; this alternative does not reduce risks to human health.

Impacts to the community from alternative SZ-2 would be limited to construction of a treatment facility and associated piping. Construction workers would be required to have appropriate training. Alternative DP-3 has similar impacts, although the lateral extent of piping is greater, and therefore would increase impacts to the community due to installation of extraction wells and piping. Under both alternative SZ-2 and DP-3, no short-term reduction to human health risk would be realized.

Alternatives DP-2 and DP-6 do not propose active remediation, therefore no adverse impacts to the community or workers occurs. Also, there is no short-term reduction to human health risk.

Alternatives were combined to include DP-6, Monitoring of the Dissolved Plume, Alternative SZ-1, No Action for the Source Zone, and Alternative SZ-2, Groundwater Extraction for Hydraulic Containment, specifically provided as a contingency, in the event that groundwater plume migration does occur. These alternatives would be implemented in conjunction with the provision of an alternative water supply as described in alternatives AWS-2 or AWS-3, as well as a proposed technical impracticability waiver for both the source zone and dissolved plume areas. Unless the contingency of SZ-2 for containment is implemented, no impact to the community or workers is contemplated and no short-term reduction in human health risk occurs. (See alternatives AWS-2 and AWS-3 for relevant discussion on short-term effectiveness.)

Implementability

MMC Study Area: Alternatives S-1 and SV-1 are the easiest to implement because no remedial actions are required. All other alternatives and combinations of alternatives are easily implemented because they all involve reliable technologies with proven histories of success. The personnel, equipment and materials required to implement each of these technologies are readily available. Alternatives involving excavation and containment would require access to an adjacent residential property, as well as potential institutional controls. Also, excavation alternatives would not be implemented underneath the existing building, if contaminants are found in that area.

DMC Study Area: Alternative GW-1 is the easiest to implement because no remedial actions are required. Alternatives GW-2 and GW-3 are easily implemented, involving reliable technologies that have been implemented at many other such sites. The personnel, equipment and materials required to implement each of these technologies are readily available. Alternative GW-4 can be readily implemented, and has been demonstrated to be technically feasible at similar sites, however, the reliability of oxidation of all potential DNAPL in a fractured till is uncertain. Alternative GW-5, excavation, is a common remediation action. Challenges facing this alternative are the proximity to a building that is actively used, and subsurface utilities. Alternatives GW-2, GW-3, GW-4 and GW-5 may all involve access to an adjacent residential property, as well as potential institutional controls. Also, excavation alternatives would not be implemented underneath the existing building, if contaminants are found in that area.

Site-wide Groundwater Study Area - Alternate Water Supply: AWS-1 is the easiest to implement because no remedial actions are required. Alternatives AWS-2, AWS-3 and AWS-4 are easily implemented because they all involve reliable and common technologies. The personnel, equipment and materials required to implement each of these technologies are readily available. Alternatives AWS-2 and AWS-3 would require extensive coordination with property owners, state and local agencies, and municipalities. Alternative AWS-4 would require similar coordination. The effectiveness of treatment for 1,4-dioxane at individual wells is questionable, and has not yet been proven to be entirely effective.

Site-wide Groundwater - Source Zone (SZ) and Dissolved Plume (DP): The no action alternatives SZ-1 and DP-1 don't require any remedial actions and are therefore the easiest to implement. Alternative SZ-2 is easily implemented in that the technology is reliable and common, and personnel, equipment and materials required to implement each of these technologies are readily available. Placement of extraction wells, however, may be difficult due to the complex hydrogeology found at the source zones, and frequent monitoring would be required. Alternative DP-3 is similarly easily implemented due to readily available technology, however, placement of extraction wells may be difficult due to the complex hydrogeology in the dissolved plume area.

Alternatives DP-2 and DP-6 do not propose active remediation or construction beyond installation of monitoring wells, therefore these alternatives are much easier to implement.

Alternatives were combined to include DP-6, Monitoring of the Dissolved Plume, Alternative SZ-1, No Action for the Source Zone, and Alternative SZ-2, Groundwater Extraction for Hydraulic Containment, specifically provided as a contingency, in the event that groundwater plume migration does occur. These alternatives would be implemented in conjunction with the provision of an alternative water supply as described in alternatives AWS-2 or AWS-3, as well as a proposed technical impracticability waiver for both the source zone and dissolved plume areas. Implementation of alternatives DP-6 and SZ-1 is easy, but implementing the contingency of SZ-2 for containment would be more difficult as previously described.

Cost

MMC Study Area: No action alternatives S-1 and SV-1 have no associated costs. Soil vapor extraction alternatives S-4 and SV-3 are generally the least expensive alternative, with cost estimates ranging from $494,000 to $505,000 if implemented alone. Containment alternative S-2 has a cost estimate of $2.7 million. The excavation alternatives, S-3 and SV-2, have cost estimates ranging from $2.6 to $3.8 million, depending on the lateral extent and depth to which excavation is required.

The combination of the two excavation alternatives for soil and soil vapor, S-3 and SV-2, achieves some overlap in volumes of soil requiring excavation, which saves some shared costs for a total of $4.9 million. The combination of excavation alternative S-3 and soil vapor extraction alternative SV-3 achieves cost savings by implementing SVE first in order to reduce VOC contaminants and the extent to which excavation is required; the total for this combination is $2.2 million. Combining containment alternative S-2 and soil vapor extraction SV-3 results in some cost savings by increasing the effectiveness of the SVE; the total for this combination is $3.0 million.

DMC Study Area: No action alternative GW-1 has no associated cost. The in-Situ chemical oxidation alternative, GW-4, is the least expensive alternative at $1.8 million. Excavation alternative GW-5 has a cost estimate of $3.2 million. The containment alternative, GW-2, and multi-phase extraction alternative, GW-3, are both priced at an estimate of $4.9 million.

Site-wide Groundwater Study Area - Alternate Water Supply: No action alternative AWS-1 has no associated cost. Alternative AWS-3, Development of New Groundwater Source and Water Distribution System, has an estimated cost of $6.6 million. This cost could change if area wells are determined to have adequate supply, and/or if treatment of water from such wells is necessary prior to distribution. Alternative AWS-2, Connection to Middletown Water Distribution System, has a cost estimate of $7.0 million. Alternative AWS-4, Point of Use Treatment is the most expensive alternative, with a cost estimate of $7.2 million.

Site-wide Groundwater - Source Zone (SZ) and Dissolved Plume (DP): No action alternatives SZ-1 and DP-1 have no associated cost. Alternative DP-6, Monitoring of the Dissolved Plume, has a cost estimate of $434,000. Alternative DP-2, Monitored Natural Attenuation for the Dissolved Plume, has an estimated cost of $1.9 million. Alternative DP-3, Groundwater Extraction - Restoration for the Dissolved Plume, has an estimated cost of $8.5 million, while alternative SZ-2, Groundwater Extraction - Hydraulic Containment for Source Zone, has a cost estimate of $8.7 million.

State Acceptance

CT DEP has reviewed the preferred alternative and has indicated that it will concur, provided that further evaluation of risks from soil vapor in the study area is examined in a manner consistent with CT regulations.

Community Acceptance

Community Acceptance: Community acceptance will be evaluated based on comments received during the comment period.

During the 30-day formal comment period, EPA will accept written comments and hold a formal public hearing to accept formal verbal comments. EPA seeks comment on the preferred alternative and all other cleanup alternatives. The preferred alternative can change based upon your comments.

Next Steps

This fall, EPA expects to have reviewed all comments and signed a Record of Decision document describing the chosen cleanup plan. The Record of Decision and a summary of responses to public comments will then be made available to the public at the site information repositories listed here, as well as on EPA's Durham Meadows Superfund Site web site noted on this page.

What is a Formal Comment?

Federal regulations require EPA to distinguish between "formal" and "informal" comments on the proposed plan. While EPA uses your comments throughout the cleanup process, EPA is only required to respond to formal comments on the proposed plan.

To make a formal comment you need only speak during the public hearing on July 28, 2005, or submit a written comment during the comment period, which ends on August 12, 2005.

EPA will not respond to your comments during the formal hearing on July 28, 2005. The fact that EPA responds to formal comments in writing only does not mean that EPA cannot answer questions. Once the meeting moderator announces that the formal hearing portion of the meeting is closed, EPA can respond to informal questions.

EPA will review the transcript of all formal comments received at the hearing, and all written comments received during the formal comment period, before making a final cleanup decision. EPA will then prepare a written response to all the formal written and oral comments received.

Your formal comment will become part of the official public record. The transcript of comments and EPA's written responses will be issued in a document called a Responsiveness Summary when EPA releases the final cleanup decision.

The Merriam Manufacturing Company facility was destroyed by fire in March, 1998.

Looking east from Main Street across the Durham Manufacturing Company property.

Use This Space to Write Your Comments or to be added to the mailing list

EPA encourages you to provide your written comments and ideas about the cleanup options under consideration for addressing the contamination at the Durham Meadows Superfund Site. You can use the form below to send written comments, or submit them via the internet. If you have questions about how to comment, please call **Jim Murphy of EPA's Community Affairs Office at 617-918-1028 or toll free at 1-888-372-7341, extension 81028, or E-mail : murphy.jim@epa.gov** Submit written comments, which must be postmarked (in the case of U.S. Mail) or received (in the case of E-mail) no later than August 12, 2005, to:

Anni Loughlin
EPA New England
1 Congress Street
Suite 1100 (HBT)
Boston, MA 02114 - 2023
E-mail: loughlin.anni@epa.gov

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(Attach sheets as needed)

Comment Submitted by: ______________________________

Mailing list additions, deletions or changes

If you did not receive this through the mail and would like to
- ❒ be added to the site mailing list
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Name : ____________________
Address: ____________________

Please check the appropriate box and fill in the correct address information above. Send to Jim Murphy at above postal or e-mail address.

United States
Environmental Protection
Agency New England

One Congress Street Suite 1100 (HBT)
Boston, Massachusetts 02114-2023

Proposed Cleanup Plan for Durham Meadows Superfund Site

Public Hearing: Thursday, July 28, 2005 7:00 p.m. Durham Public Library 7 Maple Ave